XXII. *Astronomical Observations.* *By* STEPHEN GROOMBRIDGE, *Esq. F. R. S.*

Read June 29, 1820.

Observations of the Solstices in the years 1818 and 1819.

Observed zenith distance of the Sun's centre on the meridian.

1818		Barometer.	Therm. within.	Therm. without.	Refraction.	1819		Barometer.	Therm. within.	Therm. without.	Refraction.
	° ′ ″				′ ″		° ′ ″				′ ″
June 13	28.14 53.08	29.79	72.5	81	0.29.77	June 9	28.33.30.54	29.49	61.5	68	0.30.54
14	28.11.38.72	29.87	68	66	0.30.10	16	28. 6.40.00	29.84	58	62	0.30.62
23	28. 0. 5.55	29 76	62	66	0.30.15	19	28. 1.20.52	30.00	62	68	0.30.38
27	28. 5.39.66	29 75	68	79	0.29.84	20	28. 0.21.51	30.11	62.5	66	0.30.45
28	28. 8. 9.04	29.69	66	73	0.29.97	21	27.59.47.37	30.04	62.5	68	0.30.37
29	28.10.55.40	30.08	67	72	0.30.37						
July 1	28.17.51.98	30.00	69.5	77	0.30.27						
Dec. 12	74.29.34.34	30.06	44	40	3.31.92	Dec. 13	74.32.57.59	29.70	36	32.5	3.33.32
14	74 37.55.16	30.15	43.5	41	3.34.10	26	74 48.56.96	29.44	39	32	3.35.50
19	74 50.26.17	30.21	38	34	3.40.54	27	74.46.54.68	29.39	39	34	3.33.78
22	74.52.23.59	30.45	42.5	33	3.43.15						
23	74 52. 3.00	30.31	38.5	31	3.42.94						
27	74.46.16.87	30.06	39	37	3.37.14						

The above observations computed by Mr. GROOMBRIDGE'S *Table of Refraction.*

1818	Zenith distance.	Equation.	Solstitial distance.
	° ′ ″	′ ″	° ′ ″
June 13	28.15.22.85	15.15.31	28. 0. 7.54
14	12. 8.82	11.55.34	13.48
23	0.35.70	0.24.45	11.25
27	6. 9.50	6. 1.15	8.35
28	8.39.01	8.27.31	11.70
29	11.25.77	11.17.91	7.86
July 1	18.22.25	18.12.52	9.73
			28. 0. 9.99
		″	
	Nutation	+ 7.40	
	Parallax	—4.11	+ 2.77
	Sun's Latitude	—0.52	
			28. 0.12.76
Dec. 12	74.33. 6.26	22.57.04	74.56. 3.30
14	41.29.26	14.38.20	7.46
19	54. 6.71	1.58.11	4.82
22	56. 6.74	0. 0.18	6.92
23	55.45.94	0.17.56	3.50
27	49.54.01	6.10.39	4.40
			74.56. 5.07
		″	
	Nutation	— 8.64	
	Parallax	— 8.45	— 17.58
	Sun's Latitude	—0.49	
			74.55.47.49
			28. 0.12.76
			2)46.55.34.73
	Mean obliquity, 1818		23.27.47.36

1819	Zenith distance.	Equation.	Solstitial distance.
	° ′ ″	′ ″	° ′ ″
June 9	28.34. 1.08	33.54.65	28. 0. 6.43
16	7.10.62	7. 1.93	8.69
19	1.50.90	1.39.50	11.40
20	0.51.96	0.41.67	10.29
21	0.17.74	0. 8.60	9.14
			28. 0. 9.19
		″	
	Nutation	+ 9.23	
	Parallax	—4.11	+ 4.62
	Sun's Latitude	—0.50	
			28. 0.13.81
Dec. 13	74.36.30.91	19.36 30	74.56. 7.21
26	52.32.46	3.32.75	5.21
27	50.28.46	5.36.53	4.99
			74.56. 5.80
		″	
	Nutation	—9.60	
	Parallax	—8.45	— 18.58
	Sun's Latitude	—0.53	
			74.55.47.22
			28. 0.13.81
			2)46.55.33.41
1819	Mean Obliquity	- - - -	23.27.46.70
1818	- - - - -	- - - -	23.27.47.36
	Mean obliquity at the vernal equinox, 1819.		23.27.47.03

Oppositions of the New Planets.

	Mean Time.	Right Ascension.	Declination.	Longitude.	Latitude.
	h ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
1818.	Vesta.		Par. + 5,3		
April 3	12.47.39	203.38.54.3	3.55.53.3 N	200.23.41.8	12.50.31.8 N
4	12.42.50	203.25.47.4	4. 2. 6.0	200. 8.52.1	12.51.23.5
12	12. 4. 9	201.36.56.4	4.46.53.1	198. 8.26.5	12.51.55.3
15	11.49.35	200.55.18.7	5. 0.54.2	197.23.37.9	12.49. 6.0
17	11.39.54	200.27.48.1	5. 9.18.5	196.54.22.4	12.46.24.1
	Pallas.		Par. 3.0 3.2		
Sept. 1	12.20.21	345.38.31.6	2.10.22.4 N	347.38.10.3	7.40.11.7 N
2	12.15.40	345.27.15.1	1.57.46.6	347.22.45.1	7.32.58.6
6	1 .56.56	344.42. 4.6	1. 6.25.2	346.20.42.6	7. 3. 9.5
9	11.42.53	344. 8. 3.1	0.27. 5.2	345 33 48.0	6.40. 1.3
11	11.33.31	343.45.24.6	0. 0.29.5 N	345. 2.27.3	6.24.12.1
12	11.28.50	343.34. 9.1	0.12.50.9 S	344.46.50.3	6.16.13.0
13	11.24. 9	343.22.52.8	0.26.15.1	344.31.11.5	6. 8.10.1
1820.	Pallas.		Par. —6.1 —5.7		
Feb. 1	9.42.57	96.45. 6.6	25.32.13.7 S	99.15.54.7	48.47. 4.0 S
4	9.30.22	96.33 10.2	24.30.48.1	98.53.18.1	47.46.32.0
6	9.22. 9	96.27.45.0	23.49.10.4	98.41.59.8	47. 5.57.5
10	9. 6. 5	96.22.35.4	22.19.58.0	98.26.41.6	45.36.37.1
16	8.43. 1	96 30.28.2	20. 1.36.7	98 24.49.8	43.18. 4.7
17	8.39.16	96.33.26.7	19.37.58.7	98.26.38.8	42.54.19.0
	Ceres.		Par. + 1.9 + 1.7		
Feb. 1	11.49.38	128.30.18.9	31.29. 3.2 N	122.55. 5.1	12.19. 4.7 N
4	11.34.57	127.47. 5.7	31.44.49.4	122.14.33.3	12.25. 4.3
10	11. 5.54	126.24.49 8	32.11. 3.4	120.58.39.7	12.33.19.8
16	10.37.26	125.11.27.3	32.29.41.0	119 52.25.4	12.36.37.2
17	10.32.46	125. 0.23.1	32.32. 1.8	119.42.33.6	12.36.42.6